Carrot Extract Standard Reference Material

NIST is working in collaboration with the National Institutes of Health Office of Dietary Supplements (NIH-ODS), and Food and Drug Administration (FDA), Center for Drug Evaluation and Research (CDER) and Center for Food Safety and Applied Nutrition (CFSAN) to develop a number of Standard Reference Materials (SRMs) for use in validating analytical methods and for quality assurance for constituents of dietary supplements. A carrot extract in oilwith values assigned for carotenoids, tocopherols, and fatty acids was recently completed.

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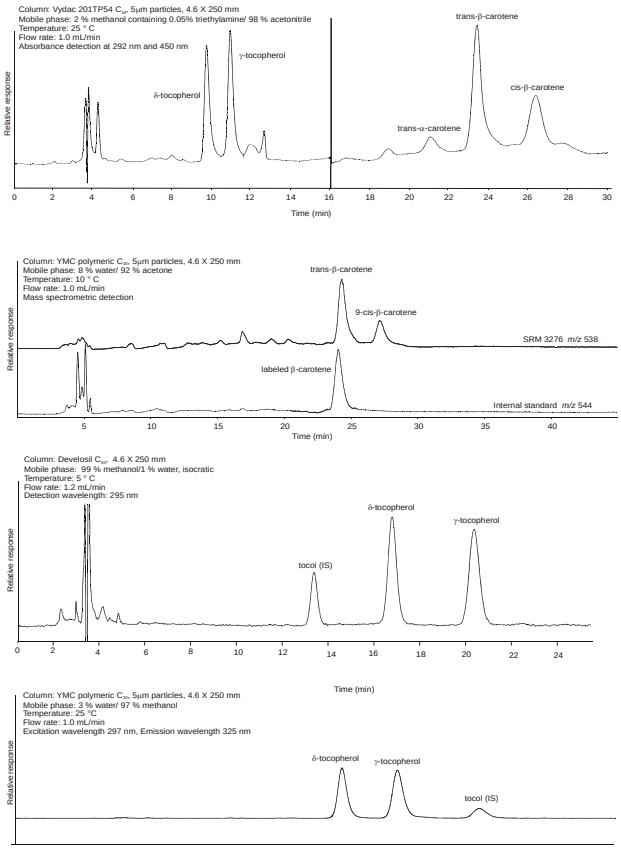
Although some of the "newer" dietary supplements do not have recommended daily intakes, beta-carotene has been used in foods and dietary supplements for many years. Vitamin A, produced from beta-carotene, is one analyte for which label information is required on both foods and dietary supplements. Thus, Standard Reference Material (SRM) 3276 Carrot Extract in Oil has been produced to assist the dietary supplement, food, nutrition, and also clinical communities in method development and validation as well as quality assurance. For carotenoid and tocopherol analyses, the material requires no sample preparation, other than dilution with an appropriate solvent, for liquid chromatographic (LC) analysis. This is in contrast to other carotenoid-containing SRMs available from NIST – SRM 968c Fat-Soluble Vitamins, Carotenoids, and Cholesterol in Human Serum and SRM 2383 Baby Food Composite – which require that carotenoids be extracted prior to analysis.

The Certificate of Analysis for this material will provide certified values for *trans*- and total beta-carotene as well as delta- and gamma-tocopherol. Reference values are assigned for 9-*cis*-beta-carotene and *trans*-alpha-carotene. Both NIST and laboratories participating in the NIST Micronutrients Measurement Quality Assurance Program provided data used for value assignment. Carotenoid and tocopherol values were assigned using results from several independent chromatographic separation and detection techniques at NIST (see Figure). Carotenoids were measured using polymeric C_{18} and C_{30} columns, both of which can separate *trans*-beta-carotene from *cis* isomers; absorbance detection was used with the C_{18} column and mass spectrometric detection with the C_{30} column. LC on the same C_{18} column, with absorbance detection, was used for measurement of the tocopherols; two different C_{30} columns with fluorescence and mass spectrometric detection were also used. The C_{30} columns are able to separate gamma- and beta-tocopherol whereas most C_{18} columns cannot; no beta-tocopherol was detected in SRM 3276.



Certified values for 12 fatty acids are also provided in this material. Fatty acids analyses were conducted at NIST and involved the use of two sample preparation methods, gas chromatographic separation, and flame ionization or mass spectrometric detection.

The carrot extract SRM can be used by the dietary supplement, food, nutrition, and clinical communities for method development, method validation, and quality assurance.

This material is intended for use in method development and as a control material to support analytical methods for the determination of beta-carotene, tocopherols, and fatty acids.